**About this project**

This is not a real computer. I mean it could be, but it isn’t based on a machine that was built or sold.

The 8008 is quite an interesting processor, and for a short while in the 1970s it was the thing to have – several machines, home made and commercial appeared for it, most famously the Scelbi and Mark-8.

Interest died quite rapidly when Intel launched the 8080, which is a heavily expanded 8008 which corrects many of the problems.

One of the consequences of this is that 8008 machines are all very much the same ; an 8008, usually clocked at 500Khz, some RAM, occasionally some ROM, sometimes a Blinkenlights system for getting programs loaded, serial I/O and tape I/O, parallel ASCII keyboard interface.

I wanted to do some 8008 development, and to produce a physically working replica of the computer I was developing on, so you could actually operate it. I decided, rather than emulate a real machine, I might as well create a design of my own.

It had to be a plausible design ; the sort of thing that might have emerged if the 8008 had lived a little longer and become the processor of choice in early machines – and it allowed me to fit it to the physical hardware I was using for emulation (Mega 2560 and ST7920 GLCD), as I didn’t want to build a real machine out of real parts. Machines with this sort of spec and performance did exist, but by the time RAM and ROM became cheap enough to waste 1k of it on video memory the 8008 was sidelined. I think you have to have been there to understand how colossal 4k of RAM memory …..

**Design**

* 8008 Central Processing unit.
* ROM Memory from 0000-1FFF (8k)
* RAM Memory from 2000-2FFF (4k)
* Expansion RAM from 3000-3BFF (3k)
* Video RAM from 3C00-3FF (1k)
* Parallel ASCII keyboard with +ve strobe
* VCO Audio Circuit based around NE566

**Notes**

1. Apart from the expense – at the time 8k of ROM and 4k of RAM would have been very expensive – there’s nothing unusual about the CPU Core. Some machines used 8223 ROMs which had 32 *bytes* of ROM memory.
2. The Video is 128 x 64 arranged as 16 bytes per line, 64 lines. This is feasible using 1970s technology.
3. The clock speed varies slightly but not noticeably between PAL/SECAM and NTSC. PAL line frequency is 15,625Hz, NTSC is 15,734Hz. This means the video display system will read bytes at 16 times that, e.g. 125Khz (PAL) 125.872Khz (NTSC). By tying the clock speed to the CPU speed this should allow us to read video memory in a phase where the 8008 is not accessing it fairly simply – latch it ourselves in one of the address latching phases. The CPU speed is thus 4 times this – 500Khz (PAL) 503.488Khz (NTSC) which can be derived from Crystals designed for the video. I think ☺
4. The keyboard is a +ve strobe ASCII keyboard generating normal codes 0-127, and is connected to I/O port 0. The strobe is connected to the interrupt which causes the processor to restart from a Halt, but nothing else (due to the inadequacy of the 8008 interrupt system).
5. The audio system is connected to Output port 8. It is an R/2R ladder operating as a simple D-A converter, which is connected to the control input of a 566 VCO, with 7 bit resolution. Bit 7 of the port latch turns it on (when logic ‘1’). Alternatively we could use a 4046 PLL or as a last resort the control input of the NE555 provides a cheap VCO. I don’t know what the release date of these parts is, but the 555 has around then ; there’s one in an RCA Studio 2 (for example). F(Out) has been defined as the lower 7 bits x 12, giving a VCO base frequency of 1.536Hz.